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| 09/747,425 | 12/21/2000 | Salvatore Leonardi | 856063.672 | 1479 |

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EXAMINER

IM, JUNGHWA M

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
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2811

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/747,425

Applicant(s)

LEONARDI ET AL.

Examiner

Junghwa M. Im

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7,8,10,11,15,16 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claims 2 and 19-20 are not considered for examination since claims 2 and 19-20 recite limitation read on Fig. 7 which is a non-elected embodiment.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-4, 7-8, 10-11, 15-16 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 11 recite a trench having a depth greater than a width. The specification does not disclose this limitation. Actually Application compares the depth of trench with one of the depletion region on page 7, line 4-10.

Claims 3-4, 7-8, 10, 15-18 are dependent on base claims 1 and 11.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 recites the limitation "said region". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 10-11 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ando (JP 08-032030).

Regarding claims 1, 11 and 15, Fig. 1 of Ando shows an a resistive structure 7, integrated in a semiconductor substrate 1, comprising a trench region having a depth greater than a width and lined with an insulating film 3, a portion of a doped polysilicon region 16 completely surrounded by a dielectric region 12, so that the resistive structure is isolated electrically from the semiconductor substrate.

Regarding claim 10, Ando discloses the dielectric region is formed in the process of oxidizing the sidewalls of a dielectric trench (See the respective portion of detailed description).

Also, Note that "the process of oxidizing" is a process designation and would thus not carry patentable weight in this claim drawn to a product. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando in view of Tsui et al. (U. S. Pat. No. 6,054,359), hereafter Tsui.

Regarding claims 7-8 and 16, Ando shows a substantially identical structure to the claimed device except two layers of polysilicon in which the second layer is undoped and the first layer implanted with a dopant. However, Fig. 4 of Tsui shows a device with a resistive structure which has a first doped polysilicon layer 24 and a second layer of undoped polysilicon 26 (Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Tsui to the device of Ando in order to have a desirable sheet resistance and more reliable contacts through having two layered polysilicon layered resistive structure.

Note that a portion of claim 8 recites the language for possible desired result, and language reciting a possible result would not carry weight. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ando in view of Hashimoto (U.S. Pat. No. 5,856,702).

Regarding claim 18, Ando shows a substantially identical structure to the claimed device except a plurality of trenches coupled by metallization. Fig. 6 of Hashimoto shows a plurality of trenches (regions with slots 14A, 14B, 14C) coupled together electrically by metallization 18.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Hashimoto into the device of Ando in order to have trenches connected by metal since a plurality of trenches provides a high resistance without increasing the resistor area and a metal contact for the trenches is needed to operate functionally.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando in view of Hashimoto and Stone et al. (U.S. Pat. No. 5,753,391), hereafter Stone.

Regarding claim 3, Ando shows a substantially identical structure to the claimed device except a plurality of trenches and patterns of the polysilicon region and the dielectric region. Fig. 6 of Hashimoto shows a plurality of trenches (regions with slots 14A, 14B, 14C). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Hashimoto into the device of Ando in order to have trenches connected by metal since a plurality of trenches provides a high resistance without increasing the resistor area.

Fig. 1 of Stone discloses in the polysilicon region 11 and the dielectric region have a serpentine pattern reducing the space requirements of the resistive structure for a given resistance value (col. 1, lines 54-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the resistive layer of Hashimoto with the teaching of Stone in order to minimize the size of a device through having a compact pattern of a passive structure in the substrate.

Regarding claim 4, Fig. 1 of Stone shows, the serpentine patterns are formed to include rungs, the rungs are connected in parallel together by a metallization (14, 16, 18).

Alternatively, Hashimoto discloses in Fig. 5, the rungs (slots with dashed lines, 14A,

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14B, 14B) are connected in parallel together by a metallization 22.

Response to Arguments

Applicant's arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on **MON.-FRI. 8:30AM-5:00PM**.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi
June 2, 2003

STEVEN LOKE